

Abstract of the Disclosure

A method is provided for rapidly reconstructing the surface, shape and material composition of objects reflecting and scattering electromagnetic radiation of a broad band spectrum, and analyzing the reflected intensity of the scattered radiation from complex 2D and 3D structures, applicable to nano-structures as well as micro-wave technologies. This method is done by simultaneously analyzing all unpolarized as well as incident polarized waves, both for TE and TM polarizations. A numerical grid is used that is larger than the feature sizes, but that accurately yields feature size predictions much smaller than the critical dimensions of the structure. This method enables in-situ and on-line analysis to be carried out on a single processor. The method also improves the ability of detecting the composition of the scattering object, by analyzing the scattered radiation. This method is applicable to the microchip and nano-technology industry, as well as to microwave applications.